

WHAT IS CLAIMED IS:

1. A receiving coil for a nuclear magnetic resonance imaging apparatus for spinal column images, wherein the apparatus has a supporting bench for the patient and an element for generating a static magnetic field perpendicularly oriented to the supporting bench of the patient, the receiving coil comprising:

at least two conductors which extend in a positioning direction of a longitudinal extension of the spinal column and in the supporting bench or in a bench parallel to the supporting bench of the patient and which have a length that is enough to cover approximately the anatomic district of the spinal column, the distance of the two conductors being on the order of magnitude of the average width of the spinal columns and the two conductors being connected in such a way to have a coherent flowing direction of current.

2. A coil according to claim 1, wherein the coil is formed by at least two rectangular turns, whose two conductors, that are to be positioned nearer the patient, are the useful detecting conductors and the opposite conductors are re-closing conductors or wires.

3. A coil according to claim 2, wherein the rectangular turns are arranged in order to subtend an envelope solid of a parallelepiped rectangular shape.

4. A coil according to claim 1, wherein the coil includes multiple detecting conductors put one beside the other, each of conductor being part of a rectangular turn.

5. A coil according to claim 4, further comprising:

two main detecting conductors that are parallel and spaced one from the other, to each of these conductors are associated on the side opposite to the one oriented towards the associated main detecting conductor one or more additional detecting conductors that are parallel with respect to the main detecting conductors and are part of as many rectangular turns put from the outside besides the rectangular turns of the main detecting conductors.

6. A coil according to claim 5, the coil has a base structure composed of a pair of rectangular parallel turns put one beside the other connected in series one with the other by means of a terminal board provided with removable connection means and a plurality of further additional rectangular turns that can be connected in series one with the other and with the turns of the base structure by means of said terminal board in conjunction with connection jumpers, which additional rectangular turns can be mount in a removable way to the base structure.
7. A coil according to claim 1, further comprising: a reflection shield of conductive material, which shield is arranged directly below the re-closing wires that are parallel to the detecting conductors and it is oriented parallel to the plane subtended by the re-closing wires.
8. A coil according to claim 7, wherein the reflection shield is composed of a RF shield that is in common with a transmitting coil.
9. A coil according to claim 1, wherein the coil is provided in conjunction with a supporting bench for a patient, which bench has a bearing structure, in said bearing structure being provided a chamber for accommodating said receiving coil.
10. A coil according to claim 1, wherein the main detecting conductors are placed at narrower lateral distances one with respect to the other than the re-closing conductors.
11. A coil according to claim 10, wherein the main detecting conductors and the re-closing conductors are placed in such a way that with respect of a central plane parallel to the said conductors the main detecting conductors and the re-closing conductors on one side of the said central plane and the main detecting conductors and the re-closing conductors have the same lateral distance.
12. A coil according to claim 11, wherein the main detecting conductors have the same distance one from the other.

13. A coil according to claim 11, wherein the re-closing conductors have the same distance one from the other.
14. A coil according to claim 11, wherein the re-closing conductors on one side of the central plane and the re-closing conductors on the other side of the central plane have a greater distance one from the other than the main detecting conductors on one side of the central plane and the main detecting conductors on the other side of the central plane.
15. A coil according to claim 2, wherein the rectangular turns forming the main detecting conductors are arranged along parallel or diverging planes one from the other, which planes provide for re-closing conductors which are transversally not aligned with the main detecting conductors.
16. A coil according to claim 15, wherein the rectangular turns forming the main detecting conductors are oriented in such a way to subtend an envelope solid of a parallelepiped shape having a non rectangular cross-section along a plane transversal, particularly perpendicular to the said main detecting conductors.
17. A coil according to claim 15, wherein the rectangular turns forming the main detecting conductors are oriented in such a way to subtend an envelope solid of a parallelepiped shape having a cross-section along a plane transversal, particularly perpendicular to the said main detecting conductors which has the form of a trapezium, particularly a regular trapezium, or a parallelogram or a rhombus.
18. A coil according to claim 15, wherein the main detecting conductors are placed in a plane coinciding with the smaller basis of the trapezoidal parallelepipedon, while the re-closing conductors are placed on the plane forming the bigger basis of the trapezoidal parallelepipedon which is parallel to the said smaller basis.
19. A coil according to claim 15, wherein the main detecting conductors and the re-closing conductors are placed symmetrically with respect to a plane oriented parallel to the said conductors and perpendicular to the plane defined by the main

conductors and or by the re-closing conductors and or both the planed defined by the said conductors.

20. A coil according to claim 19, wherein the turns are such that each turn forms entirely a main detecting conductor and a re-closing conductor, part of the said turns, particularly half the number of the said turns being oriented substantially parallel to the lateral surfaces of the enveloping parallelepipedon defined by the coil, which surfaces are parallel to both the associated main detecting conductor and corresponding re-closing conductor.

21. A coil according to claim 15, wherein the coil is closed on itself providing an endless conductor.

22. A coil according to claim 15 , wherein the coil is made of at least two loop sections which a first loop section being mechanically separated at the two opposite ends form the corresponding end of the two opposite ends of the second loop sections the facing first ends of the said first and second loop sections forming the outputs of the coil which are fed to a differential amplifier, while the second facing ends of the said first and second loop sections are electrically connected by means of an active tuning unit.

23. A coil according to claim 22, wherein the coil is made of at least three successive loop sections each of the three sections having a first and a second end the first end of the first loop section forming the output of the coil together with the second end of the third loop section, while between the end of the second loop section associated to the second end of the first loop section and the end of the second loop section associated to the end of the first end of the third loop section the said first and third loop sections are electrically connected to the said second loop section by means of electronic units one of which is a tuning unit and the other of which is a detuning unit.

24. A coil according to claim 22, wherein the coil is formed by four loop sections having a first and a second end the first end of the first loop section forming with the facing second end of the fourth loop section the outputs of the coil, while

the intermediate second and third loop sections are electrically connected one with the other and respectively to the first and to the fourth loop section by means of an electronic unit, one unit being a tuning unit and the other two units being two detuning units.

25. A coil according to claim 22, wherein the coil is formed by several loop sections each having a first and a second end mechanically separated from the other adjacent loop sections, the first end of the first loop section and the second end of the last loop section forming the outputs of the coil, while the intermediate loop sections are connected to the preceding and to the following one electrically, at least part of the said intermediate loop sections being connected by electronic units forming at least one a tuning unit and at least one a detuning unit.

26. A coil according to claim 22, wherein the main detecting conductors are continuous.

27. A coil according to claim 22, wherein the loop sections are separated one from the other at the re-closing conductors, at an intermediate, particularly at a central zone thereof.

28. A coil according to claim 22, wherein the re-closing conductors are formed partly by one end of one loop section forming a first main detecting conductor and partly by the end of a second loop section forming a second main detecting conductor.

29. A coil according to claim 22, wherein the tuning unit is an active tuning unit, having an active tuning component.

30. A coil according to claim 23, wherein the detuning unit is a passive electronic circuit.

31. A coil according to claim 22, wherein an coil output signal amplifier is provided which is housed within the volume defined by the coil inside an electromagnetic shielded enclosure.